



Stakeholder power in industrial symbioses: A stakeholder value network approach



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ABSTRACT

Forming and sustaining an industrial symbiosis depends on several actors. Actors that have an interest in the symbiosis and the possibility to influence it are called “stakeholders”. According to social exchange theory and resource dependence theory, the power of actors in a network depends on the dependence of other actors on the resources they control. We adapt the stakeholder value network approach from the strategic management literature to the industrial symbiosis context as a means to provide insights into the power of stakeholders of an industrial symbiosis. The approach is applied to a waste incinerator steam network symbiosis case study in France, which has been successfully operated and extended over decades. The results from the case study show that using the stakeholder value network approach enables the assessment of the relative power of symbiosis stakeholders and the identification of key resources on which their power is based. We propose the application of the approach to further case studies in order to identify patterns in the power distribution within symbiosis networks.

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1. Introduction

An industrial symbiosis “engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water and byproducts.” (Chertow, 2000) According to Deutz (2014), an industrial symbiosis is “a flow of underutilised resource(s) (comprising substances and/or objects and/or energy), from an entity which would otherwise discard them, to another entity which uses them as a substitute for new resources.” The potential benefits of a symbiosis can be economical, environmental, and societal (Hein et al., 2015; Hellweg and Canals, 2014). Industrial symbiosis is a “collective approach” based on collaboration (Chertow, 2000). Two forms of collaboration can be distinguished. The first form of collaboration happens between actors that are directly involved or plan to be involved in a material/energy exchange. Such actors are called “symbiosis partners” in the following

(Ashton and Bain, 2012; Hein et al., 2015). The role of actors that are not symbiosis partners, such as business associations, anchor tenants, governmental agencies, etc. has been studied in several publications (Boons et al., 2014, 2014; Boons et al., 2011; Chertow, 2007; Heeres et al., 2004; Mirata, 2004; Paquin and Howard-Grenville, 2009; Paquin and Howard-Grenville, 2012; Spekkink, 2013, 2015). However, an aspect that has been less studied is how (potential) symbiosis partners can use this actor network to get access to vital resources for creating, maintaining, and extending a symbiosis (Brullot et al., 2014; Paquin, Howard-Grenville, 2009; Paquin and Howard-Grenville, 2012). Such actors that are vital for a project or an organization’s success have been extensively treated in the strategic management literature as “stakeholders”. Narrow and broad definitions exist for “stakeholder” (Mitchell et al., 1997). According to Freeman (1984, p.46) “any group or individual who can affect or is affected by the achievement of the organization’s objectives” is considered a “stakeholder”. We can adapt this definition of stakeholder by replacing “achievement of the organization’s objectives” by “creating, maintaining, or extending a symbiosis”. Or alternatively, stakeholders are actors that have a “stake” in a symbiosis (Cameron et al., 2011a; Hein et al., 2011). For evaluating stakeholder salience, we adopt the criteria of “power”

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and “urgency” from Mitchell et al. (1997). They use a third criterion called “legitimacy”. We omit legitimacy, since the status of legitimacy as a relevant criterion for stakeholder salience has been contested (Frooman, 1999, p.193). Frooman (1999) and Rowley (1997) extend stakeholder theory by basing power on the resource dependence relationships in a network. This theory is based on resource dependence theory (Pfeffer and Salancik, 1978), which is a special case of social exchange theory (Blau, 1964; Emerson, 1972b; Emerson, 1962). A “resource” in this context is “essentially anything an actor perceives as valuable.” (Frooman, 1999, p.195) The power an actor holds with respect to a resource depends on the urgency (time-sensitivity, criticality) (Mitchell et al., 1997, p.867) of another actor needing the resource, the resource’s nature, and the availability of alternatives (substitutability) (Frooman, 1999, p.195). This interpretation of power draws from Emerson (1962), who defines “power” as the dependence of one actor on another, where an actor may have alternative sources for the resource needed (Cook and Emerson, 1978; Thibaut and Kelley, 1959). Power is manifested in situations where an actor can overcome the resistance of another (Emerson, 1962, p.32). Furthermore, we distinguish between dyadic exchanges between two actors and generalized exchanges where resources are transmitted via a chain of actors (Bearman, 1997; Cook and Yamagishi, 1992; Ekeh, 1974; Lévi-Strauss, 1963, 1969; Takahashi, 2000; Yamagishi and Cook, 1993). An exchange that relates actors indirectly to each other is also called a “network-generalized exchange” (Yamagishi and Cook, 1993).

In this article, we adapt the stakeholder value network approach, previously developed in (Cameron et al., 2011a; 2008; 2011b; Feng, 2013; Fu et al., 2011) for exploring the distribution of power in terms of control over resources between stakeholders of an industrial symbiosis. The goal is to illuminate the power of specific stakeholders and to identify key resources. Specifically, we aim at answering the following two questions: Which stakeholders are the most powerful in a specific symbiosis stakeholder value network? What are the key resources contributing to stakeholder power in a specific symbiosis stakeholder value network? We start with a literature survey on existing stakeholder analysis approaches in Section 2, assessing their appropriateness to the industrial symbiosis context and continue with literature that explores the relationships between actors in industrial symbioses. We then present the stakeholder value network approach in Section 3 and propose an adaptation of this approach to industrial symbiosis. We go on to apply this approach to an industrial symbiosis case study in France in Section 4. Finally, a discussion of the results is presented in Section 5, followed by conclusions in Section 6.

2. Literature survey

The literature survey first explores existing stakeholder analysis approaches and how far they are able to represent stakeholder power in terms of resource dependence theory. Furthermore, the industrial symbiosis literature is surveyed for existing approaches to illuminate the relationships between symbiosis actors.

The field in strategic management that deals with relationships of stakeholders with respect to a focal organization is called “stakeholder theory” (Freeman and McVea, 2001; Freeman, 1984). Commonly the relationships are represented in a “hub-and-spoke” model in which only the direct relationships between the focal organization and its stakeholders are considered (Donaldson and Preston, 1995, p.69; Freeman, 1984). Frooman (1999) extends this model to relationships between stakeholders, representing indirect relationships between the focal organization and stakeholders. In particular, he explores different strategies for how the focal

organization can influence stakeholders and vice versa. In a hub-and-spoke model, the focal organization can only engage in direct relationships with stakeholders. However, as Frooman (1999) remarks, such a limited representation would miss the richness of real interactions, which go beyond direct relationships. In triadic or more general relationships the focal organization and stakeholders can influence each other indirectly via allies. For example, A and B are stakeholders of the focal organization. The focal organization can use its power to get stakeholder A to perform an action that leads stakeholder B to provide the focal organization with an important resource. In such a case A is considered an ally of the focal organization. Frooman (1999) calls this an indirect strategy.

Stakeholder theory serves as a basis for stakeholder analysis. According to Reed et al. (2009, p.1933), stakeholder analysis is a process that: i) defines aspects of a social and natural phenomenon affected by a decision or action; ii) identifies individuals, groups and organizations who are affected by or can affect those parts of the phenomenon and iii) prioritizes these individuals and groups for involvement in the decision-making process. The results from stakeholder analysis can support the management of stakeholders, understanding the policy context or assessing the feasibility of future policies (Brugha and Varvasovszky, 2000).

Numerous stakeholder analysis methods exist and an overview is provided in Reed et al. (2009) and Brugha and Varvasovszky (2000). In the following, we only take methods into consideration that go beyond dyadic relationships and deal with aspects of power. One set of methods categorizes stakeholders with respect to their agreement and disagreement over a set of issues (Arcade et al., 1999; Bendahan et al., 2001). Direct and indirect ways of how actors can exert power are also taken into consideration. Although a solid grounding in stakeholder theory seems to be lacking, these approaches can be loosely affiliated with social exchange theory. “Power” is used in a rather broad sense and includes cohesive, utilitarian, and symbolic power (Etzioni, 1964; Mitchell et al., 1997).

A more recent method is the stakeholder value network approach, which is grounded in social exchange and resource dependence theory. Variations of the method have been introduced in the literature (Cameron et al., 2011a; 2008; 2011b; Feng, 2013; Fu et al., 2011), along with applications to space programs and the energy sector. The method focuses on resources the focal organization and its stakeholders provide to each other. “Power” is used in the restricted sense of resources that are subject to economic and social exchanges (Cameron et al., 2011a).

In the following, we build on the stakeholder value network approach for two reasons. First, the approach allows for identifying the most important dyadic and more complex dependence relationships along with the exchanged resources in a stakeholder network. Second, we argue that its theoretical grounding in the more recent literature on stakeholder theory is more solid than for its alternatives. However, the approach needs to be adapted to the industrial symbiosis context and we attempt to further improve the grounding in social exchange and resource dependence theory.

In the second part we survey the industrial symbiosis literature for the types of relationships between symbiosis stakeholders and more specifically, how far power, based on resource dependence theory has been treated.

The role of symbiosis stakeholders and the different forms of relationships between them are explored in numerous publications (Ashton and Bain, 2012; Baas and Boons, 2004; Baas, 2005; Boons et al., 2011; Boons and Spekkink, 2012; Boons and Baas, 1997; Boons et al., 2014, 2014; Domenech and Davies, 2011; Heeres et al., 2004; Hewes and Lyons, 2008; Mirata and Emtairah, 2005; Mirata, 2004; Paquin, Howard-Grenville, 2009; Paquin and Howard-Grenville, 2012; Spekkink and Boons, 2015). A frequent topic is the role of actors who facilitate the development of

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